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Why Amazon uses both the New York Times Best Seller List and customer reviews: An empirical study of multiplier effects on product sales from multiple earned media

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ABSTRACT

In today's dynamic media landscape, products are reviewed by consumers in social media and reported by journalists in traditional media. This paper will focus on the relationship among the two types of "earned" media and product sales. Previous studies have focused on either traditional or social earned media, but rarely both. We will aim to bridge that gap using the following points of analysis: the New York Times Best Seller List as traditional media; Amazon user reviews as social media; and book purchases through Amazon as product sales. We find that: (1) both traditional and social earned media influence sales; (2) sales have a reciprocal effect on social earned media; and (3) traditional and social earned media influence each other. Communication through multiple media is known to produce the "synergy effect" in which one media activity enhances the effect of another. Our results suggest a new benefit unique to the use of multiple earned media. We call this the "multiplier effect," which occurs when one earned media activity increases the level of another by becoming a "sounding board" that amplifies positive messages, as well as a bridge that allows messages to propagate freely in an interactive media system. Therefore, multiple earned media produce combined sales effects greater than those resulting from the sum of their parts. This analysis supports Amazon's decision to use multiple earned media to benefit from an ecosystem where product sales and earned media both influence and are influenced by one another. The paper will address the implications for marketing communication and media industry.

1. Introduction

Amazon began to use the New York Times Best Seller List on its website in 1999. This move was made without permission from the Times, resulting in a lawsuit in a federal court. (The suit was later settled, which will be discussed in Section 4.) The case was important for the future of Internet and electronic commerce according to the Chairman of the House Telecommunications, Trade, and Consumer Protection Subcommittee, Representative W. J. "Billy" Tauzin [1]. By 1999, Amazon had also invented customer review, the most used online shopping tool. The provision of both the Best Seller List and Amazon customer review harbingered the sea change in the media and communication industry in the previous decade.

Communication involves sender, audience, channel, activity, and message. We adopt the following typology to classify marketing-related media activities based on *who creates the message* and *who owns the media channel* [2,3]. *Paid media* refers to advertising generated by a company or its agency and disseminated through a channel owned by others; *owned media* refers to activities conducted by a company through its own channel, such as a company blog; and *earned media* describes communications about a company's product generated by other entities and expressed through either own or outside channels. What distinguishes earned media from paid or owned media is its autonomy, or ability to operate independent of a company's command.

This article seeks to examine Amazon's motivation for integrating two earned media. The individual influences of the Best Seller List (traditional earned media) and customer review (social earned media) have been well established. The Encyclopedia Britannica has called the New York Times the "newspaper of record" in the United States [4], meaning it exerts the greatest influence among American news publications over the outcome of the subject it chooses to report. A classic study by McCombs and Shaw [5] described such influence as an "agenda-setting" function of the mass media. Meanwhile, Amazon owns the patent on customer review and uses it in every product category it carries [6]. Customer review is becoming an integral part of every consumer's purchasing experience while Amazon is developing a reputation as "The Everything Store" [7,8]. By focusing on the *collective* effects of Amazon's multiple earned media, we study how autonomous earned media act collectively to improve product sales via the following questions:

(1) What are the effects of traditional and social earned media on product sales when both are present?

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(2) What is the effect of product sales on earned media?
(3) What is the relationship between two earned media?

Our findings show that social earned media, traditional earned media, and product sales are interdependent. First, Amazon customer review and the Best Seller List increase product sales. Second, sales increase the number of Amazon customer reviews. Third, Amazon customer reviews prolong a book's stay on the Best Seller List. Conversely, appearance on the Best Seller List increases the number of Amazon customer reviews. In addition to the direct positive effects on product sales, each source of earned media acts as a sounding board to amplify the positive message it receives. Such positive messages can originate from other earned media or from the resonating media itself. The amplification feature requires no effort from the company selling the product because earned media operate independently. Only two interacting earned media are needed to repeatedly multiply positive messages. Such multiplier effects are similar to the synergy effects – the main argument for using integrated marketing communication – in that both make combined media impact sales more than the sum of their parts do. However, the two effects have distinct mechanisms. Synergy effects occur when one media activity helps consumers to better digest another media activity, thereby enhancing its effect. Multiplier effects help to increase the level of one earned media activity by resonating with another.

Amazon's decision to use both the Best Seller List and the customer review feature can be argued from two traditional angles: the strong influence of these two particular media individually and the presence of synergy effects (both of which are demonstrated in our study). Yet the contribution of this research is to provide a fresh argument: Rather than any number of paid or owned media or a single earned media, Amazon used *two earned* media (one traditional plus one social) to produce the multiplier effects. Unlike synergy effects that apply to all types of media (paid, owned, and earned), multiplier effects occur *only* in earned media due to their autonomy. While we focus on the New York Times Best Seller List and Amazon's customer review feature, the practical implication of our finding is that companies can benefit from the use of any two earned media. We demonstrate two-way relationships between earned media and their environment, with each influencing another; such interactions mirror those among organisms of an ecological system that allow them to function as a unit. Thus, we borrow the ecological term "ecosystem" to describe the system of multiple earned media. The decision question addressed in this paper is: Can companies benefit from multiple earned media coverage, and how can they create an ecosystem where multiplier effects work to their advantage? The answer reflects the evolving relationships among company, consumer, and media outlet. In the previous world of paid and owned media alone, consumers and media outlets were passively acted-upon: companies dictated the messages in the media outlets to persuade consumers. In the earned media era, consumers and media outlets are active participants: they influence one another and collectively shape the messages in the ecosystem.

There has been an intense debate in the communications industry about the future of traditional media at this point in time [9]. Our contribution to the debate is twofold. First, this study reveals a competitive development that substantiates the fear of traditional media practitioners regarding social media. Specifically, we shed light on how social media relates to the core value of traditional media. While the agenda-setting function of traditional media (in this example, influencing which books customers buy) continues today, social media is effectively competing for this role. Second and more importantly, this study adds a missing piece to the narrative on the state of the media industry: the cooperative element that exists between traditional and social media. The agenda-setting function of traditional media gets multiplied by social media, and vice versa. This study therefore paints a picture of an ecosystem where traditional and social media share the agenda-setting function. By showing how traditional media benefit from being an integral component of the system, this study supports the view articulated by the Deputy Editor-in-chief of the Guardian in the UK, Katharine Viner, that the future of traditional media/journalism is "to embrace the ecosystem of the web and combine established journalistic techniques with new ways of finding, telling and communicating stories" [9].

This paper is organized as follows. In Sections 2 and 3, we present a recent literature review and hypothesis development. We then describe the data and model in Section 4, and present the empirical results in Section 5. We conclude with Section 6, which discusses the implications of our findings for the marketing and media industries and addresses limitations and suggestions for future research.

2. Literature review

This paper follows the recent stream of literature that examines company's decision to use multiple media (Table 1). The central question throughout the integrated marketing communication (IMC) literature is why a company would choose to use multiple media (including paid, owned and earned) activities simultaneously. Four reasons have emerged. First, the benefits of different media activities vary and therefore one may not serve as a substitute for another. For example, advertising works most effectively at an early stage of product introduction and wears out later as consumers pay more attention to word of mouth (WOM) [10]. Once a product has become familiar to the public, the primary role of advertising is a reminding one, while social engagement functions by both reminding and enhancing enjoyment. Advertising therefore cannot replace social engagement, particularly for entertainment products [11]. Second, since advertising and Electronic Word of Mouth (eWOM) both disseminate product information, companies can reduce expenditures by substituting paid and owned media pursuits with free earned media activities when available [12]. Third, the dominant benefit of multiple media is the "synergy effect" [13,14] which occurs when one media activity helps consumers to more effectively digest the effects of another, thereby offering greater advantages to the company than it would derive from one medium alone. For example, consumers relive images of a TV advertisement when hearing a related radio commercial [15], allowing them to better understand the TV message. Similar interaction has been found between sentiments expressed in tweets and news reports in the context of stock investment [14]. Fourth, recent studies suggest that the level of earned media activities can be influenced by advertising. Before a product is introduced to the market, TV advertising can encourage blogging activities because bloggers are most likely to seek product information from companies before product launch [16].

Table 1
Comparison of multiple media activities.

	Channel 1	Channel 2
Bruce et al. [10]	Social earned media (Yahoo Movie User Review)	Traditional and social paid media (advertising on TV, radio, and online)
Feng and Papatla [12]	Social earned media (user review)	Traditional paid media (advertising)
Lovett and Staelin [11]	Social earned media (social engagement)	Traditional paid media (advertising)
Onishi and Manchanda [16]	Social earned media (blog)	Traditional paid media (advertising)
Stephen and Galak [3]	Social earned media (blog, forum)	Traditional earned media (mentions in newspaper, magazine, TV, radio)
Trusov et al. [25]	Social earned media (referral)	Traditional earned and owned media (News, company event and press)
Yu et al. [14]	Social earned media (blog, forum, tweet)	Traditional earned media (news report)
This article	Social earned media (Amazon user review)	Traditional earned media (New York Times bestseller)

Ironically, TV advertising can also suppress eWOM because users of electronic media are less motivated to transmit information when they believe there is enough available to consumers through TV advertising [12]. Building on the idea that advertising influences earned media, we further propose that multiple earned media influence each other.

3. Hypothesis development

Reporting by traditional media involves a mixture of facts and opinions. Creators of opinion-based information are usually experts in a field (such as movie critics who write reviews featured in major US newspapers) or celebrities (e.g., Oprah Winfrey, who disseminates such information through her book club [17,18]. Such opinion-based product information can include facts. For instance, Walter Mossberg of the Wall Street Journal describes specifications of a gadget before presenting his personal experience [19]. Both expert opinion and celebrity endorsement have been found to increase product sales and company value [20–22]. The New York Times Best Seller List is an example of fact-based information. Billboard charts play similar roles in the music industry [23], as bestseller lists are not unique to either the New York Times or the book industry. However, no other publisher of a best seller list can rival the New York Times' combination of journalistic respect – having won the Pulitzer Prize 112 times, and readership – having the third largest circulation in the U.S. A recent study finds that appearing on the New York Times Best Seller List increases a book's sales [24]. Consumers themselves, rather than experts or celebrities, convey messages through emerging media activities such as blogs [16]; forums [3]; online referral [25]; and user review [10]. Electronic WOM is shown to positively impact sales of books, movies, automobiles, and other products [12,26]. Based on these findings, we propose the following hypotheses:

H1. *Social earned media positively impact product sales.*

H2. *Traditional earned media positively impact product sales.*

Due to the positive effect of eWOM on sales, researchers have been interested in the factors that motivate consumers to provide feedback on products [27–29]. When a large number of consumers have bought a product, there is a broad base of experience with that product, resulting in a large number of enthusiastic consumers willing to issue warnings or suggestions to fellow consumers. Empirical evidence shows that eWOM can be both a precursor to and an outcome of sales in the movie and automobile industries [12,30]. Product sales may also have reciprocal effects on traditional media. As mentioned previously, The New York Times Best Seller List is based on book sales through multiple sources including online outlets [31]. It is likely that Amazon book sales have positive effects on the New York Times Best Seller List [32]. In this study, we exclude the sales effects on traditional media due to data limitation and propose the following:

H3. Product sales reciprocally impact social earned media.

One earned medium can influence another. Amazon customer review as a social earned media activity is an extension of traditional offline WOM. Traditional media such as newspaper and radio influence offline WOM because opinion leaders read or listen to information from such sources and disseminate it to followers. By this process, WOM replays messages from traditional media in the two-step flow of communication theory [33]. Consumers also generate WOM to participate in a social discussion [34], and traditional media set agendas for the society [5]. For example, when a fashion magazine features a clothing style, it becomes a topic of conversation among the general population [35]. A large-scale study of news and blogs conducted in 2009 estimated that it takes only 2.5 hours for bloggers to pick up influential news phrases such as “lipstick on a pig” and “financial crisis” from traditional media's online sites [36].

The goal of journalism is to report factual and ongoing events of public concern [37], and journalists are increasingly using social media such as Twitter as sources for new stories [9]. For example, the New York Times technology editor Damon Darlin reads TechCrunch for story ideas [38]. Although a majority of the popular news-related phrases originate from traditional media sites and diffuse to blogosphere, there are also phrases that flow in the opposite direction [36]. In our empirical context, Amazon customer reviews can influence the Best Seller List for a number of reasons. As discussed in H3, the New York Times Best Seller List is based on book sales through multiple sources. Electronic WOM is part of overall WOM. Readers and creators of Amazon customer reviews can also spread WOM among people in their offline environment [39,40]. In turn, such WOM influences book purchasing at brick-and-mortar book stores including independent book stores, national chains like Barnes and Noble, specialty stores such as the Hudson News at transit hubs, and department stores including Target and others. In addition, Amazon customer reviews influence traditional media activities. For example, Brad Stone's book about the founder of Amazon, “The Everything Store: Jeff Bezos and the Age of Amazon,” received a one-star review from Mr. Bezos's wife, MacKenzie Bezos, that generated wide attention from traditional media including the New York Times, the Wall Street Journal, and the Washington Post [41]. The emerging marketing literature on social and traditional media has so far demonstrated influence flowing in one direction only: specifically, the mention of a company's name in traditional media increases eWOM referrals [25], and discussion in online community and blog posts about a company increases the mentions of the company in traditional media [3]. In this paper, we propose that traditional and social earned media influence each other equally.

H4. *Traditional earned media positively impact social earned media.*

H5. *Social earned media positively impact traditional earned media.*

Fig. 1 presents our conceptual framework that integrates traditional earned media, social earned media, and product sales.

4. Data, variable, and model

The New York Times publishes a weekly section called “The New York Times Book Review” which features write-ups by either in-house staff or commissioned outside reviewers [52]. The section also includes the Best Seller List, compiled by editors at the “News Survey” Department [32], which is independent from the written reviews. We collected all 583 books that appeared on the Best Seller List between 2000 and 2005 through the New York Times' online archive. Tables 2 and 3 show summary statistics and correlation matrix respectively. Two key measures are length of time in weeks on the List ($week_{NYT}$) and peak rank achieved during that time ($peak_{NYT}$). The book that remained on the list the longest (178 weeks) is “Oh, the Places You'll Go!” by Dr. Seuss, followed by “The Da Vinci Code” by Dan Brown (174 weeks). Most books did not approach that longevity; the average stay among our sample was 6.46 weeks. The Best Seller List publishes the top 17 best-selling books in the previous week (1 being the highest rank and 17 the lowest). A book's peak rank ranges from a value of 16 to 1, meaning that all of the books in our dataset ranked above the last spot at some point. The average peak rank on the list is 7.22.

Amazon customer review consists of a text review, a five-star numerical rating, and an optional video feature. For the five-star review, Amazon displays the average rating (*valence*) and number of ratings (*volume*). Researchers also consider a third statistic: either variance or standard deviation (*sd*), which is the square root of variance.[1] Amazon

[1] Variance and standard deviation serve the same purpose: capturing the degree of consistency or difference between ratings. While either variable leads to the same empirical results, we use standard deviation because it is on the same scale as valence, whereas variance is to the power of two. However, the difference is inconsequential to the analysis.

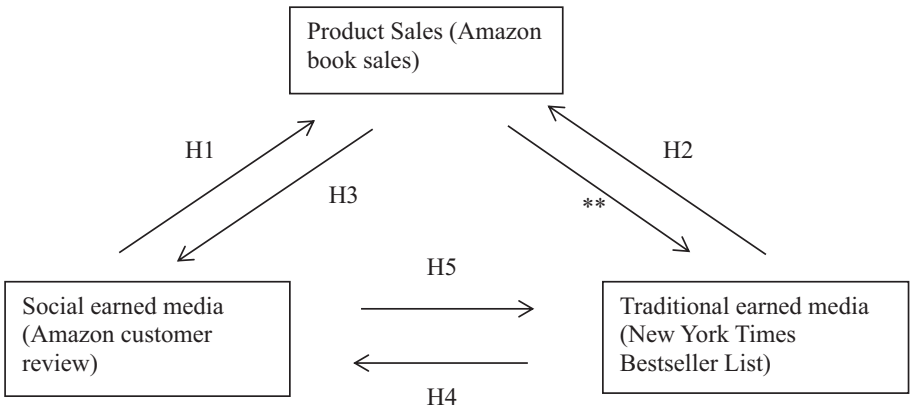

Fig. 1. Conceptual relationship among product sales, social, and traditional earned media.

presents the variance by showing the distribution of ratings over different stars. First, to study the impact of social earned media on sales, we collect valence, volume, and standard deviation for reviews posted by the date on which the sales rank is posted. On average, the top selling books receive 169.51 reviews. Average valence for our sample is 3.67 and 1.12 is the average standard deviation. Amazon allows consumers to provide feedback to a customer review. For each book, we counted the number of affirmative votes (denoted by *helpful*). On average, a book receives 555 helpful votes. Second, to study the impact of social earned media on traditional earned media, we collected the three statistics for reviews posted before and during a book's appearance on the Best Seller List (denoted by volume_{NYT}, valence_{NYT}, and sd_{NYT}). On average, the books received 75.92 reviews before and during listing; had valence of 3.77; and showed a standard deviation of 0.99.

We also consider two control variables for each book: price and category count (denoted by *price* and *category* respectively). The average price is $24.93 with a standard deviation of $2.63. Amazon assigns each book to one or multiple categories. For example, "The Da Vinci Code" belongs to the categories of "contemporary," "suspense," and "religion and spirituality." On average, a Best Seller book belongs to 3.9 categories. For marketing outcome variable, we use book sales rank. Following the literature [26], we use logarithmic transformation of sales rank (denoted by *sales*) because the relationship between actual sales unit and logarithmic transformation of sales rank is approximately linear [42].[2] The range of logarithmic transformation of sales rank is between 1.28 and 6.39 with a standard deviation of 0.77.

We first specify the effects of traditional and social earned media on sales. After the New York Times sued Amazon for using the Best Seller List without permission, the two companies reached a settlement. Amazon is allowed to use the List on the condition that book titles are displayed in alphabetical order rather than numerical rank which is not mentioned on the site [43]. Consequently, users of Amazon's website know only that a book is one of the top 17 best sellers, but not its rank. Therefore, we use the number of weeks listed (week_{NYT}) rather than the peak rank to capture the effect of traditional earned media. For social earned media, previous research has shown that the three statistics – volume [44], valence [26], and standard deviation (sd) [45] – affect sales. IMC literature models synergy effects using an interaction term between multiple media activities [13,14]. Therefore, we specify synergy effects between social and traditional earned media by a product term of social and traditional earned media (valence $*$ sd $*$ volume $*$ week_{NYT}). User reviews vary in their helpfulness, and helpful reviews are more likely to influence the buying decisions of consumers. Therefore, we include the number of "helpful" votes (*helpful*). We also include category count (*category*) because a book whose topic has broad appeal attracts more segments of consumers. Finally, we include price as a control variable.

4.1. Product sales equation

$$\begin{aligned}\text{Sales} = {} & \alpha_0 + \alpha_1 \text{price} + \alpha_2 \text{category} + \alpha_3 \text{valence} + \alpha_4 \text{sd} + \alpha_5 \text{volume} \\ & + \alpha_6 \text{week}_{NYT} + \alpha_7 \text{valence} * \text{sd} * \text{volume} * \text{week}_{NYT} \\ & + \alpha_8 \text{helpful} + \epsilon_1.\end{aligned}$$

Next, we specify the equation for social earned media. First, according to prior literature [12,30], we include volume because it functions as not only a precursor to but also an outcome of sales. Second, traditional earned media (week_{NYT}) influence social earned media. Third, valence can influence volume. While high valence motivates dissatisfied consumers to write reviews for vengeance, low valence drives satisfied consumers to write reviews for defense [30]. According to Cheung and Lee [53], consumers write reviews to achieve recognition, and it is easier to stand out if the other reviews are similar (or standard deviation is low). Standard deviation may thereby influence volume. Thus, we include valence and standard deviation in our equation. Fourth, consumers write reviews for reciprocity: the more help they receive, the more they give. Reading helpful reviews by others may motivate consumers to contribute, so we include the number of helpful votes (helpful). Finally, according to Sundaram et al. [29], consumers write reviews to balance emotions. An expensive product elicits strong emotion because consumers invest significant cognitive and financial

Table 2
Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max
sales	4.63	0.77	1.28	6.39
category	3.90	1.71	1.00	12.00
price	24.93	2.63	10.95	35.00
volume	169.51	367.12	1.00	5039.00
valence	3.76	0.74	1.00	5.00
sd	1.12	0.39	0.00	1.75
helpful	555.52	1307.58	0.00	25,309.00
volume_{NYT}	75.92	224.13	0.00	3049.00
valence_{NYT}	3.77	1.01	0.00	5.00
sd_{NYT}	0.99	0.48	0.00	1.74
week_{NYT}	6.46	11.03	1.00	178.00
peak_{NYT}	7.22	4.61	1.00	16.00

[2] If sales rank is x, a logarithmic transformation is defined mathematically as $\log(x)$.

Table 3
Correlation matrix.

	sales	cat	price	vol	val	sd	help	vol_N	val_N	sd_N	we_N	pe_N
sales	1											
category	−0.13*	1										
price	0.08*	0.01	1									
volume	−0.47*	0.18*	−0.10*	1								
valence	−0.11*	−0.04	−0.07	−0.04	1							
sd	−0.14*	0.04	−0.001	0.13*	−0.65*	1						
helpful	−0.45*	0.08*	−0.05	0.72*	−0.08*	0.18*	1					
$volume_{NYT}$	−0.38*	0.17*	−0.08*	0.93*	−0.04	0.10*	0.77*	1				
$valence_{NYT}$	−0.03	−0.03	−0.03	−0.02	0.61*	−0.33*	−0.06	−0.02	1			
sd_{NYT}	−0.12*	−0.01	0.10*	0.17*	−0.57*	0.76*	0.19*	0.14*	−0.18*	1		
$week_{NYT}$	−0.38*	0.16*	−0.14*	0.59*	0.02	0.04	0.61*	0.64*	0.003	0.07*	1	
$peak_{NYT}$	0.16*	−0.08*	−0.19*	−0.20*	0.08*	−0.09*	−0.18*	−0.21*	0.09*	−0.20*	−0.33*	1

cat = category, vol = volume, val = valence, help = helpful, vol_N = $volume_{NYT}$, sd_N = sd_{NYT}, we_N = $week_{NYT}$, pe_N = $peak_{NYT}$.
* $P < 0.1$

resources in purchasing it. Therefore, we include price as a control variable.

4.2. Social earned media equation

$$\text{Volume} = \beta_0 + \beta_1 \text{price} + \beta_2 \text{sales} + \beta_3 \text{valence} + \beta_4 \text{sd} + \beta_5 \text{week}_{NYT} + \beta_6 \text{helpful} + \epsilon_2.$$

Finally, we specify the equation for traditional earned media. We include volume, valence, and standard deviation ($valence_{NYT}$, $volume_{NYT}$, sd_{NYT}) of customer reviews before and during the listing period to capture social earned media's effects on traditional earned media. In addition, we include the peak rank ($peak_{NYT}$) that a book obtained on the Best Seller List. Consumers who read the New York Times learn the actual ranking of the Best Sellers are more likely to purchase a higher-ranked book. This, in turn, may prolong the book's stay on the list. Finally, we include book price and category count as control variables.

4.3. Traditional earned media equation

$$\text{Week}_{NYT} = \gamma_0 + \gamma_1 \text{price} + \gamma_2 \text{category} + \gamma_3 \text{valence}_{NYT} + \gamma_4 \text{sd}_{NYT} + \gamma_5 \text{volume}_{NYT} + \gamma_6 \text{peak}_{NYT} + \epsilon_3.$$

Common unobserved factors can affect the error terms of the three equations (ϵ_1, ϵ_2, ϵ_3), so we assume that the error terms are correlated.

5. Empirical results

The endogenous variables in the simultaneous equation model are sales, volume and $week_{NYT}$. We will begin this analysis by discussing their instruments. Firstly, the endogenous variables do not appear on the right hand side of the traditional earned media equation; therefore, the structural equation is also its reduced form. The exogenous variables price, category, $valence_{NYT}$, sd_{NYT}, $volume_{NYT}$, and $peak_{NYT}$ are instruments for $week_{NYT}$. Secondly, the sales equation has volume and $week_{NYT}$, as well as an endogenous interaction term (valence * sd * volume * $week_{NYT}$), on the right hand side. We need to treat the interaction term as a new endogenous variable rather than a function of volume and $week_{NYT}$ [46]. We choose valence * sd * helpful * $peak_{NYT}$, valence * sd * helpful * price, and valence * sd * price * $volume_{NYT}$ as its instruments. The instruments for volume are exogenous variables in the system plus the instruments for the interaction term. The sales equation is identified with the instruments. Thirdly, the social media equation has sales and $week_{NYT}$ on the right hand side. The instruments for sales are exogenous variables in the system plus the instruments for the interaction term. The social media equation is also identified. We ran reduced form estimation for each equation and found heteroskedasticity in the errors. To correct standard deviation, we used robust two-stage-least-square methods for the sales and social earned media equations; and robust linear regression for the traditional earned media.

We report structural estimates for the sales equation in Table 4. First, the estimates on valence, standard deviation, and volume are significant. Higher valence (negative valence coefficient due to inverse relationship between sales rank and actual sales units) increases book sales. Valence reflects customer satisfaction [47]; and higher customer satisfaction signals higher product quality, increasing the likelihood of more purchases. High standard deviation in customer review suggests that a product is horizontally differentiated [48], implying that a product has attributes that match some consumer segments well. On the other hand, the same attributes may be unattractive to other consumer segments. For example, young adults prefer "The Hunger Games" for its wild (but unrealistic to conservative readers) imagination of a fantasy future, while older readers favor the Great Gatsby for its restrained (but contrived to adventurous readers) record of the gilded age in American history. Hence, a horizontally differentiated product tends to receive different ratings from different segments. High volume of customer reviews increases sales. Numerous reviews create buzz around a product, thus increasing awareness. These results show that social earned media have positive effects on sales (H1). Second, the estimate of number of weeks listed is significant. The longer a book appears on the Best Seller List, the higher Amazon sales are, implying that traditional earned media positively impact sales (H2). Comparing the coefficients of the Best Seller List and the review volume (−0.026 vs. −0.00044), we calculate that remaining of the list for a week produces marginal effects on book sales equivalent to 59 customer

Table 4
Structural estimates for product sales equation.

	Coef.	Std. Err.	Sig.
intercept	7.473	0.456	***
category	−0.024	0.018	
price	−0.019	0.012	
valence	−0.324	0.049	***
sd	−0.550	0.103	***
volume	−0.00044	0.00026	*
$week_{NYT}$	−0.026	0.011	**
valence * sd * volume * $week_{NYT}$	5.93E−06	1.03E−06	***
helpful	−0.00048	5.88E−05	***

R-squared = 0.35.
* Significance level: $P < 0.1$.
** Significance level: $P < 0.05$.
*** Significance level: $P < 0.01$.

Table 5
Structural estimates for social earned media equation.

	Coef.	Std. Err.	Sig.
intercept	1465.24	433.495	***
price	10.210	3.399	***
sales	−282.405	64.507	***
valence	−85.459	21.685	***
sd	−101.474	35.141	***
$week_{NYT}$	30.085	4.2644	***
helpful	−0.006	0.037	

R-squared = 0.8167.
*** Significance level: $P < 0.01$.

reviews. Third, the estimate on the interaction between social and traditional earned media is significant, providing evidence for synergy effects. A smaller interaction term is associated with higher sales. One explanation is that valence and standard deviation move in opposite directions, as high standard deviation is associated with low valence (see significant negative correlation in Table 3). Finally, more helpful votes are associated with higher sales because consumers trust reviews with helpful votes.

We report the structural estimates on the social earned media equation in Table 5. The estimate on sales is significant and negative. Since sales rank is inversely related to sales unit, sales increase social earned media activity (H3). Increasing the logarithm of sales rank by 1 can increase review volume by 282. The estimate on weeks listed is significant and positive, supporting H4. A one-week stay on the Best Seller List increases review volume by 30. The estimates on valence and standard deviation are both significant and negative. One explanation for low valence is that consumers post reviews to help other consumers and companies [27,29]. Those consumers who are satisfied with the products are more likely to post reviews if the valences are low, in order to help fellow consumers recognize a good product and help the company promote it. One explanation for the low standard deviation is that consumers post reviews for social reasons; specifically, to look smart among peers [49]. If reviews are more homogenous, it is easier to stand out by writing different opinions, increasing the likelihood that an individual will post a review. Finally, the estimate on price is significant and positive. Consumers write reviews to balance their positive and negative emotions about a product [34,53], and an expensive product elicits stronger emotions.

We report the structural estimates on our traditional earned media equation in Table 6. The estimate on price is negative and significant, suggesting that a low price contributes to a longer stay on the Best Seller List. The estimate on review volume before and during the listing period is positive and significant implying that social earned media positively affect traditional earned media (H5). The estimate on the peak rank is negative and significant, implying that consumers are more likely to purchase higher-ranked books, consequently extending their stay on the list. On average, moving the peak rank up by one position is associated with an average increase of 0.573 week (roughly 4 days).

We also examine the reduced form estimation for sales equation (Table 7). Category count coefficient is significant and positive because a book belonging to more categories has broader appeal and therefore attracts more consumers. The estimates on valence and standard deviation are significant and negative, suggesting high valence and standard deviation increase product sales. The estimate on helpful vote is significant and positive. A large number of helpful votes are associated with large sales. The estimate on valence of reviews before and during Best Seller listing is significant and positive, implying that a low valence leading to Best Seller listing is associated with high product sales. One explanation is that a low valence increases volume as discussed previously (Table 5), and a higher volume increases product sales (Table 4). The estimate on peak rank is significant: high peak is associated with high sales. We also examine the reduced form estimation of social earned media (Table 8). The price estimate is significant, and high price is associated with high volume. Both valence and standard deviation are significant and positive. Interestingly in structural estimation, low valence and standard deviation are associated with large volume. One explanation for the difference is that high valence and standard deviation increase product sales (Table 4), which in turn boost volume (Table 5), so the overall effects of high valence and standard deviation are positive on volume. Helpful vote is significant and more helpful votes are associated with higher volume, suggesting reciprocal behavior: the more helpful reviews consumers read, the more they write. Volume preceding Best Seller listing is significant; higher volume prior to the listing is associated with higher overall volume. Peak rank on the Best Seller List is significant, with high peak rank associated with more reviews. One explanation is that high peak rank leads to more weeks listed (Table 6), which in turn increases

Table 6
Structural and reduced form estimates for traditional earned media equation.

	Coef.	Std. Err.	Sig.
intercept	21.417	7.234	***
category	0.295	0.542	
price	−0.581	0.350	*
$valence_{NYT}$	0.309	0.324	
sd_{NYT}	−0.871	0.762	
$volume_{NYT}$	0.029	0.006	***
$peak_{NYT}$	−0.573	0.084	***

R-squared = 0.4783.
* Significance level: $P < 0.1$.
*** Significance level: $P < 0.05$.

Table 7
Reduced form estimation of sales equation.

	Coef.	Std. Err.	Sig.
intercept	6.609	0.474	***
category	−0.033	0.018	*
price	0.0005	0.0114	
valence	−0.400	0.063	***
sd	−0.497	0.129	***
helpful	−0.0008	0.0003	***
$valence_{NYT}$	0.063	0.030	**
sd_{NYT}	−3.33E−02	8.54E−02	
$volume_{NYT}$	1.42E−04	9.21E−04	
$peak_{NYT}$	0.029	0.007	***
valence * sd * helpful * $peak_{NYT}$	−8.49E−06	1.74E−06	***
valence * sd * helpful * price	5.31E−06	2.51E−06	**
valence * sd * price * $volume_{NYT}$	−7.19E−07	1.05E−05	

R-squared = 0.3688.
* Significance level: $P < 0.1$.
** Significance level: $P < 0.05$.
*** Significance level: $P < 0.01$.

Table 8
Reduced form estimation of social earned media equation.

	Coef.	Std. Err.	Sig.
intercept	−119.947	67.951	*
category	2.184	3.061	
price	2.997	1.758	*
valence	20.251	10.417	**
sd	39.456	14.904	***
helpful	0.205	0.119	*
$valence_{NYT}$	−4.332	3.352	
sd_{NYT}	3.076	9.171	
$volume_{NYT}$	1.384	0.316	***
$peak_{NYT}$	−6.141	1.307	***
valence * sd * helpful * $peak_{NYT}$	0.0034	0.0005	***
valence * sd * helpful * price	−0.0019	0.0010	*
valence * sd * price * $volume_{NYT}$	−0.0006	0.00296	

R-squared = 0.9235.
* Significance level: $P < 0.1$.
** Significance level: $P < 0.05$.
*** Significance level: $P < 0.01$.

Table 9
Estimation of endogenous interaction term.

	Coef.	Std. Err.	Sig.
intercept	−17,986.5	3966.342	***
valence * sd * helpful * $peak_{NYT}$	−0.733	0.346	**
valence * sd * helpful * price	0.365	0.1889	*
valence * sd * price * $volume_{NYT}$	2.460	1.230	**

R-squared = 0.7827.
* Significance level: $P < 0.1$.
** Significance level: $P < 0.05$.
*** Significance level: $P < 0.01$.

volume directly (Table 5), or indirectly via sales (Tables 4 and 5). The reduced form of traditional earned media is the same as its structural form (Table 6). Finally, we examine the estimation of the media interaction term in Table 9. We find all instruments are significant, supporting our choice of instruments. Overall, the reduced form estimates and structural form estimates are consistent.

6. Discussion and conclusion

This paper develops a simultaneous equation system to capture the interdependent relationships among traditional earned media (TEM), social earned media (SEM), and product sales (PS). Our approach provides important extensions to prior research.

First, while studying the relationship between traditional and social earned media, previous literature has examined influence flowing in one direction only, either from traditional to social [25], or from social to traditional [3]. Our study is the first to demonstrate the phenomenon as a two-way street. Specifically, a lengthy appearance on the Best Seller List increases eWOM volume; and a large volume of eWOM increases the duration on the Best Seller List.

Second, our findings show that traditional earned media – particularly the New York Times Best Seller List – influences book sales [24]. We also demonstrate two indirect effects of the Best Seller List. Since appearance on the list increases reviews and reviews boost product sales, we see the indirect effects flowing from traditional to social earned media (TEM–SEM–PS indirect effect). A second indirect effect arises as a book's appearance on the Best Seller List leads to more customer reviews, in turn lengthening the stay on the Best Seller List, resulting in additional sales. Here we see the indirect effects of traditional earned media upon itself (TEM–SEM–TEM–PS indirect effect). In the first case, the customer reviews serve as a "bridge" to transmit the influence of the Best Seller List; while in the second it acts as a "sounding board" to increase the influence of the List.

Third, our findings show that social earned media influence product sales via the three statistics (volume, valence, and standard deviation) of customer reviews (eWOM). Unlike previous studies that reveal the WOM impact on product sales via only two statistics, our findings provide the first evidence that all three jointly influence product sales. More importantly, we demonstrate two indirect effects mirroring the previous discussion on traditional earned media: first, from social earned media to traditional earned media (SEM–TEM–PS indirect effect); and second, from social earned media to itself (SEM–TEM–SEM–PS indirect effect).

Fourth, we show that sales can increase social earned media activity by increasing eWOM volume; therefore, social media activity exhibits an indirect effect (SEM–PS–SEM–PS indirect effect) produced by the feedback from sales [30].

Overall, our empirical results suggest that sales, social earned media, and traditional earned media all interact in a digital ecosystem. Multiplier effects then emerge from such an interactive environment. Among the four factors that justify the IMC approach discussed in Section 2, synergy effects appear similar to multiplier effects. To repeat, both impact sales more than the sum of their parts do. However, they are driven by distinct mechanisms. Synergy effects work by enabling consumers to digest one media activity more effectively in the presence of another, although both activities are kept at their original levels. Multiplier effects function through the amplification of one media activity by another at no cost to the company since earned media is autonomous. By contrast, companies incur a cost to increase paid media activities (i.e., advertising) as well as owned media activities, such as hiring staff to write blog entries.

Our findings regarding the multiplier effects help to explain Amazon's rationale for using both the Best Seller List and customer review. The managerial implication of such strategy has been evidenced by Amazon's long-term performance since 1999. We thus encourage companies to adopt the same strategy of using multiple earned media in their integrated marketing communications. Practical use of earned media differs somewhat from the use of paid or owned media. Rather than select the messages directly, companies can use earned media by facilitating its access to consumers. For example, Amazon makes the Best Seller List accessible to non-readers of the New York Times by featuring it on Amazon's website. While we analyze only one combination of earned media (social and traditional), other combinations are possible. Using multiple earned media provides such traditional benefits as individual media effects and synergy effects; but more importantly, it produces multiplier effects that are not available to either paid or owned media, nor to single earned media.

The current research has several limitations. First, we do not have data on the effect of Amazon sales prior to the New York Times Best Seller listing. We therefore cannot draw conclusion on the effect of product sales on traditional media as implied by the New York Times and reported by its peer media outlet [32]. Second, we do not have access to data on paid media (advertising expenditure). Study of the interaction among paid media, earned media (both traditional and social), and product sales would constitute an interesting direction for future research. Nonetheless, lack of data on paid media does not diminish the importance of the current study. When Amazon started selling books in 1995, it promoted them by hiring staff to write reviews (a form of paid media). However, Amazon stopped using staff review since realizing the effects of user review [50].

This research is also set against the backdrop of an uncertain time for traditional media, and provides the following implication for the communication industry. The $250 million change in stewardship of the Washington Post – the paper second only to the New York Times in Pulitzer Prize awards – from the legendary Graham family to Amazon's founder Jeff Bezos, raises an intriguing question about the role of traditional media in the new landscape [51]. Product information is only one of the media's numerous functions. Nonetheless this research, after disentangling social media from its traditional counterpart, is the first to show that by reporting a subject (the Best Seller List), a traditional media outlet influences the outcome of the subject (Amazon book sales). The profound influence of traditional media – "setting agenda for society" (determining which books to push to the public) – continues in the new media landscape. However, the concerns of traditional media practitioners are real: social media (in our case, Amazon customer review) is now competing for the agenda-setting role. Yet the big picture is hardly a net loss for traditional media, as social media amplifies its agenda-setting function (and vice versa). We expect the "friend-or-foe" debate regarding the relationship between the two media types to continue for some time. However, we can see that a premium traditional media outlet clearly benefits from being an integral member of the new media landscape; while the newcomer – social media – also benefits from the presence of its older counterpart (traditional media).

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